

REMARKS

Claims 1-7, 11, and 22-23 remain in the present application. Claims 8-10, 12-19, and 20-21 were previously cancelled without prejudice. Claims 1-7, 11, and 22-23 are hereby amended. No new matter is being added.

Claims Rejections

Claims 1-7, 11 and 22-23 are rejected under 35 USC 103(e) as being unpatentable over Lo et al. (US Patent 6,566,897). Applicants respectfully traverse this rejection with respect to the claims as now amended.

Claim 1, as amended, now recites as follows.

1. A method for automated focusing of an electron image in an electron imaging system, the method comprising:
 - selecting an area on which to focus and impinging an electron beam over the area;
 - measuring an **average** intensity of detected electrons over a range of filter bias voltages so as to determine an energy filter cut-off voltage; and
 - setting an operating condition of the electron imaging system **based on the energy-filter cut-off voltage** so as to put the electron image into focus **without needing to determine a sharpness or contrast of the electron image**.

(Emphasis added.)

As recited in amended claim 1, after selecting an area on which to focus, an **average** intensity of detected electrons is measured over a range of filter bias voltages so as to determine an energy filter cut-off voltage. Then, an operating condition is set **based on the energy filter cut-off voltage** so as to focus the image **without needing to determine the sharpness or contrast** of the electron image.

Claim 1, as amended, is supported, for example, in FIG. 3 of the present application and the description relating thereto. For convenience, FIG. 3 is reproduced below.

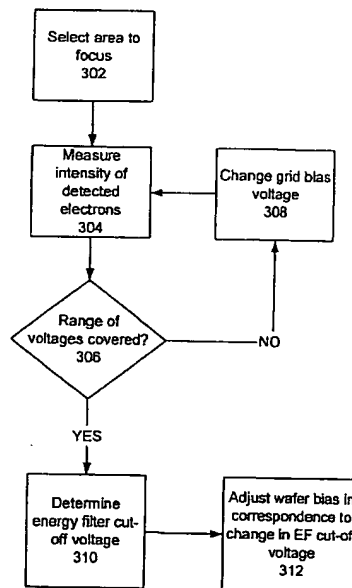


FIG. 3

As recited in the original specification, "Advantageously, using this method, the area selected does not require the amount of feature detail required by the conventional auto-focusing procedure. This is because the method **does not rely on contrast-based focusing.**" (Specification, page 5, lines 17-20, emphasis added.) "Instead, the method measures and utilizes an **average** detected intensity and **can even focus on a bare wafer without an image pattern.**" (Specification, page 12, lines 10-12, emphasis added.)

Lo et al. pertains to a "Voltage Contrast Method and Apparatus for Semiconductor Inspection Using Low Voltage Particle Beam." According to Lo et al, "Prior to imaging an area of the substrate, the tool **charges an area surrounding the image area** to eliminate or reduce the effects caused by

assymmetrical charging in the surrounding area. ... The result is a highly uniform image with **improved contrast** for accurate defect detection.” (Lo et al, Abstract, emphasis added.) As such, Lo et al. pertains to charging a surrounding area to improve contrast in voltage contrast images. In voltage contrast images, differences in voltages on different surface features produce contrast between the features.

In comparison to Lo et al., the claimed invention pertains to a method of focusing an area **“without needing to determine a sharpness or contrast of the electron image.”** In fact, as stated above, “the method measures and utilizes an **average** detected intensity and **can even focus on a bare wafer without an image pattern.**” (Specification, page 12, lines 10-12. emphasis added.) In other words, the claimed invention “blindly” focuses the image without a need for any features or contrast in the image. Hence, the claimed invention is very distinctive over the teachings of Lo et al.

Regarding focusing, the system in Lo et al. is described as merely having “Conventional software ... for functions such as ... auto-focus” (Lo et al., Column 8, lines 36-39.) Such a conventional procedure for auto-focusing is described in relation to FIG. 2 of the present application and involves selecting an area having sufficient feature detail and determining a sharpest image of that area.

For at least the above-discussed reasons, applicants respectfully submit that claim 1 is patentably distinguished over the cited reference.

Claims 2-7 depend from claim 1. As such, for at least the reasons discussed above in relation to claim 1, claims 2-7 are also patentably distinct over the cited reference.

Claim 11, as amended, now recites as follows.

11. A system for automated focusing of an electron image in an electron beam inspection apparatus, the system comprising:
means for selecting an area on which to focus and for impinging an electron beam over the area;
means for measuring an **average** intensity of detected electrons over a range of filter bias voltages so as to determine an energy filter cut-off voltage; and
control means configured to set a stage bias voltage of the electron beam inspection apparatus **based on the energy-filter cut-off voltage** so as to put the electron image into focus **without needing to determine a sharpness or contrast of the electron image**.

For at least the reasons discussed above in relation to claim 1, claim 11 is also patentably distinct over the cited reference.

Claims 22-23 depend from claim 11. For at least the reasons discussed above in relation to claim 11, claims 22-23 are also patentably distinct over the cited reference.

Conclusion

Applicants respectfully submit that claims 1-7, 11 and 22-23, as amended, are now in patentable form. Favorable action is respectfully requested.

Respectfully submitted,
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